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DESCRIPTION OF A NEW *RHAGOLETIS* SPECIES FROM TROPICAL MEXICO (DIPTERA: TEPHRITIDAE)[1]

VICENTE HERNÁNDEZ-ORTIZ

Instituto de Ecología, A. C. Apartado Postal 63, Xalapa, Veracruz 91000 Mexico.

Abstract.—A new species of *Rhagoletis* from the humid tropics in Mexico is described. Specimens of ***Rhagoletis turpiniae***, n. sp., were collected in Xalapa and Los Tuxtlas, Veracruz, Mexico. Based on morphological characteristics of male and female terminalia, this new species is placed in the *cingulata* species group. Information on parasitoids and host plants of *R. turpiniae* is included, and two species of the plant family Staphyleaceae are recorded for the first time as a host for the genus *Rhagoletis* Loew.

Resumen.—En el presente trabajo se describe ***Rhagoletis turpiniae*** n. sp. con material procedente de dos localidades del estado de Veracruz, México (Xalapa y Los Tuxtlas). Esta nueva especie queda incluída en el grupo de especies *cingulata* con base principal en las características morfológicas de los genitales tanto de machos como hembras; se provee información detallada sobre sus plantas huéspedes y parasitoides asociados, destacando que por primera ocasión se registran dos especies de la familia Staphyleaceae como huéspedes del género *Rhagoletis* Loew.

Key Words: Tephritidae, *Rhagoletis,* new species, host plants, parasitoids

The genus *Rhagoletis* comprises about 57 species which are distributed in the Palearctic, Nearctic, and Neotropical regions, showing high preferences for temperate zones (Bush 1966, Foote 1984). Thirty-seven of all known *Rhagoletis* species (including the recently described *R. electromorpha* Berlocher (1984), and *R. ramosae* Hernández (1985)), are found in the American continent. According to the supraspecific classification by Bush (1966) and Foote (1981), *Rhagoletis* is represented by 10 species groups in the Nearctic and Neotropical regions. The Nearctic and Holarctic *pomonella, cingulata, tabellaria, ribicola,* and *alternata* species groups mainly are distributed in North America, of which only the species *R. pomonella* (Walsh) and *R. cingulata* (Loew) occur in Mexico; the *suavis* group is represented by five of the six known species, including two endemic ones (*R. zoqui* Bush and *R. ramosae* Hernández). The *nova, psalida, ferruginea,* and *striatella* species groups contain about 50% of all American species. They occur exclusively in Central and South America, except for *R. striatella* Wulp which is present in Mexico and the United States. In this paper, I describe a new species of the *cingulata* group, discuss the relationships between the species of this group, and present information about the host plants and parasitoids of *Rhagoletis turpiniae,* n. sp.

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Materials and Methods

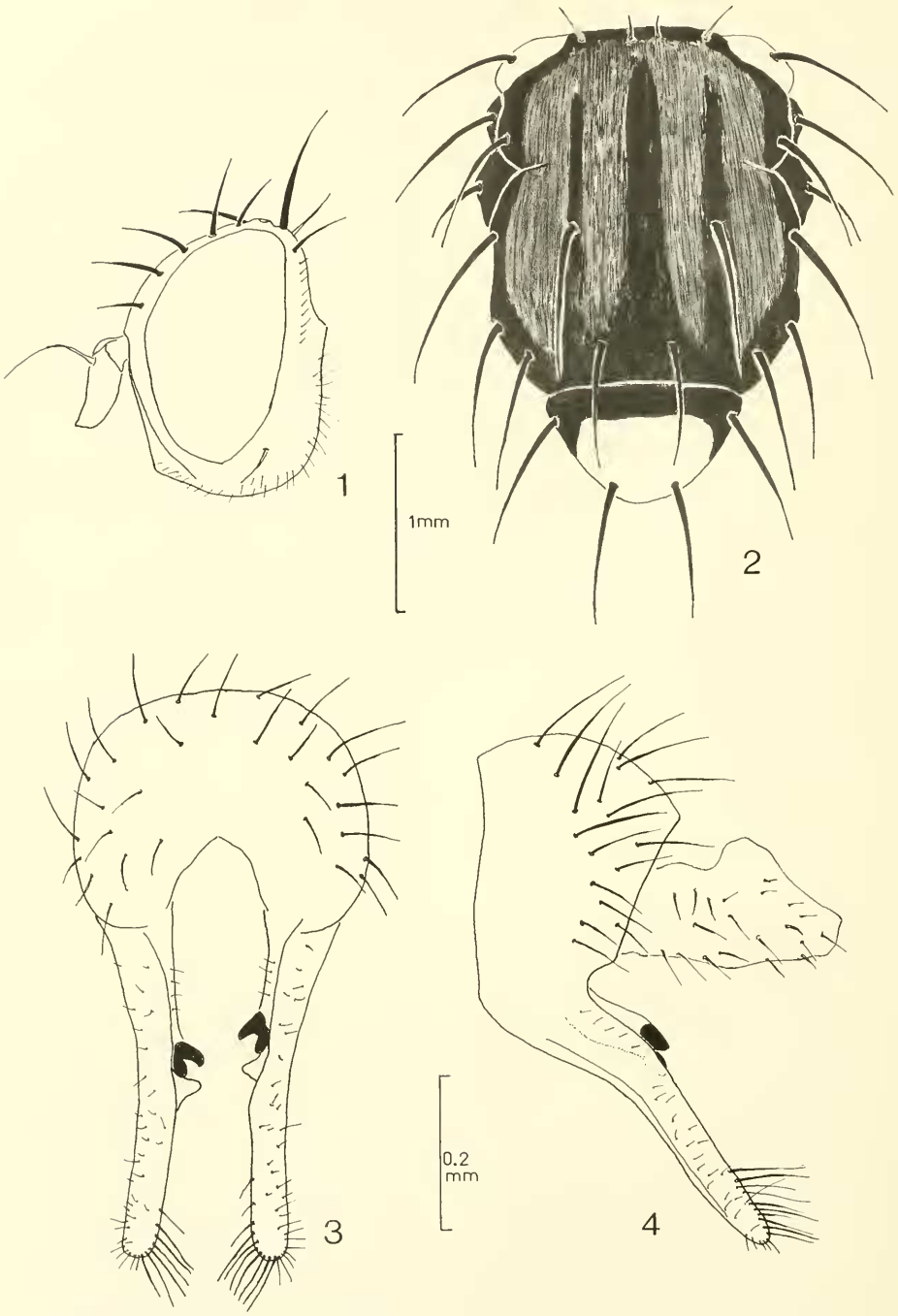
The description of *Rhagoletis turpiniae*, n. sp., is based on 99 adult specimens examined. Some of these specimens were collected in light traps, and others reared from fruits of *Turpinia insignis* (H. B. & K.) Tul and *T. occidentalis breviflora* Croat proceeding from two localities in the state of Veracruz, Mexico (Xalapa and Los Tuxtlas). Botanical material was compared with herbarium samples and identified by herbarium personnel at the Estación de Biología Los Tuxtlas (Refugio Cedillo T., MEXU), and the Dirección de Vegetación y Flora of Instituto de Ecología (Gonzalo Castillo, XAL). I follow the morphological terminology of McAlpine (1981) and Norrbom and Kim (1988a). Acronyms for institutions used in the text are as follows: CNC—Canadian National Collection, Ottawa; UNAM—Instituto de Biología de la Universidad Nacional Autónoma de México, México D.F.; IEXV—Instituto de Ecología, Xalapa, Veracruz; MSU—Michigan State University, East Lansing; USNM—National Museum of Natural History, Smithsonian Institution, Washington, D.C.

Rhagoletis turpiniae Hernández, New Species
(Figs. 1–10)

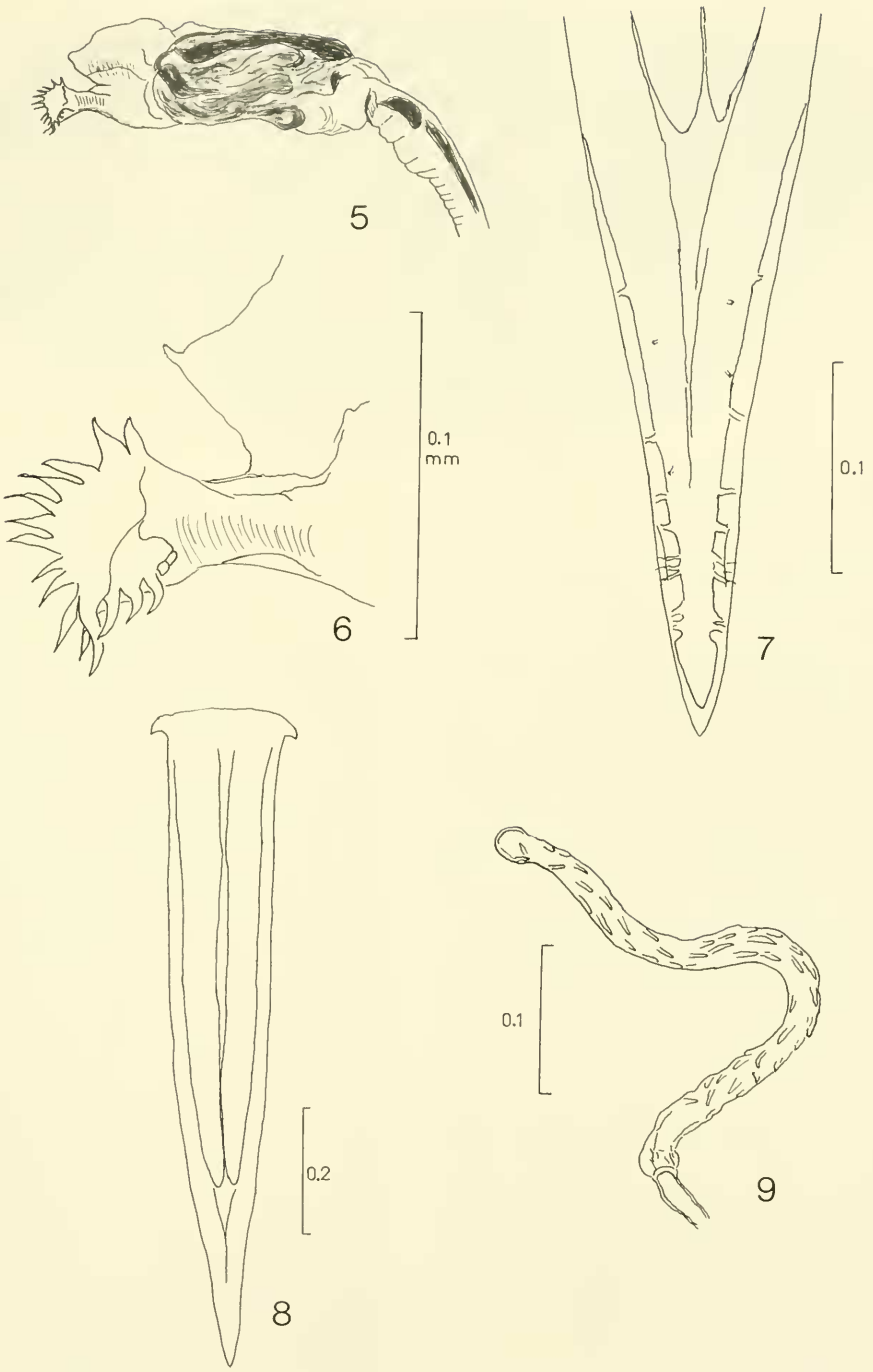
Type data: Holotype ♂ (IEXV) MEXICO: Veracruz, Xalapa, Jardín Botánico 1280 m, 10–15-VIII-1990, V. Hernández, R. Pérez and J. Valenzuela colls. "Ex-larva en frutos de *Turpinia insignis.*" Paratypes. Same data as holotype (17 ♂♂ and 23 ♀♀); 20–25-VII-1990 (6 ♂♂ and 10 ♀♀); MEXICO: Veracruz, Est. Biol. Los Tuxtlas 160 m, 14-VI-1990, R. Pérez and J. Valenzuela colls. "Ex-larva en frutos de *Turpinia occidentalis breviflora*" (3 ♂♂ and 5 ♀♀); same data as paratypes from Los Tuxtlas except not reared from host plant: 21–28-II-1985, A. Ibarra coll. (sex unknown); 12-III-1985, A. Ibarra and E. Ramírez colls. (2 ♂♂); 23-IV-1985, A. Ibarra and E. Ramírez colls. (3 ♀♀); 18–21-V-1985, A. Ibarra and E. Ramírez colls. (12 ♂♂ and 15 ♀♀); 9–16-VI-1986, A. Ibarra coll. (3 ♂♂ and 1 ♀); 2-VII-1987, V. Hernández coll. (2 ♀♀). 3 ♂♂ and 3 ♀♀ in CNC; 5 ♂♂ and 5 ♀♀ in UNAM; 3 ♂♂ and 3 ♀♀ in MSU; 3 ♂♂ and 3 ♀♀ in USNM; all other paratypes deposited in IEXV.

Diagnosis: Body blackish with most of head yellow; third antennal segment pointed at apex. Scutal microtrichial pattern consisting of four longitudinal bars all connected anteriorly; postpronotum white, pleuron entirely black except for a whitish band just below notopleuron. Fore femur wholly yellow but mid and hind femora blackish. Wing pattern with all transverse bands present, including anterior and posterior apical bands which are separated for a hyaline fascia that usually extends beyond vein R4+5; apical hyaline spot at end of R2+3 usually absent or extremely small in some specimens.

Description: Head yellow with frons and antenna reddish, face nearly straight in lateral view, ocellar tubercle slightly blackish. Head macrosetae black except postocellars and genal bristles yellow (Fig. 1); antenna about 0.6 times as long as face, apex of third segment sharply pointed. Thorax: mesonotum 2.37–2.62 mm long (Fig. 2), scutum with fine pollinose microtrichia yellow golden in pattern of four longitudinal bars joined anteriorly, black stripes between them slender; scutal setulae yellow; postpronotum whitish; scutellum with quadrate whitish medial spot, base black, including area of basal scutellar setae; halteres whitish; subscutellum and mediotergite black. Pleura entirely black except for whitish band immediately below notopleuron. Foreleg entirely yellow including coxa; midleg with femur blackish except yellow apex, tibia and tarsus mostly yellowish; hindleg with femur and tibia blackish, but tarsus yellowish. Wing: Length 3.7–4.9 mm (Fig. 10); all transverse bands present; sub-basal band slender and extended to inferior apex of cell bcu; discal and subapical bands wider than



Figs. 1–4. *Rhagoletis turpiniae*. 1, Lateral view of head. 2, Dorsal view of mesonotum. 3, Posterior view of male terminalia (proctiger omitted). 4, Same in lateral view.



Figs. 5–9. *Rhagoletis turpiniae*. 5, Distiphallus (glans). 6, Apex of distiphallus. 7, Aculeus tip. 8, Aculeus (ovipositor). 9, Spermathecae.

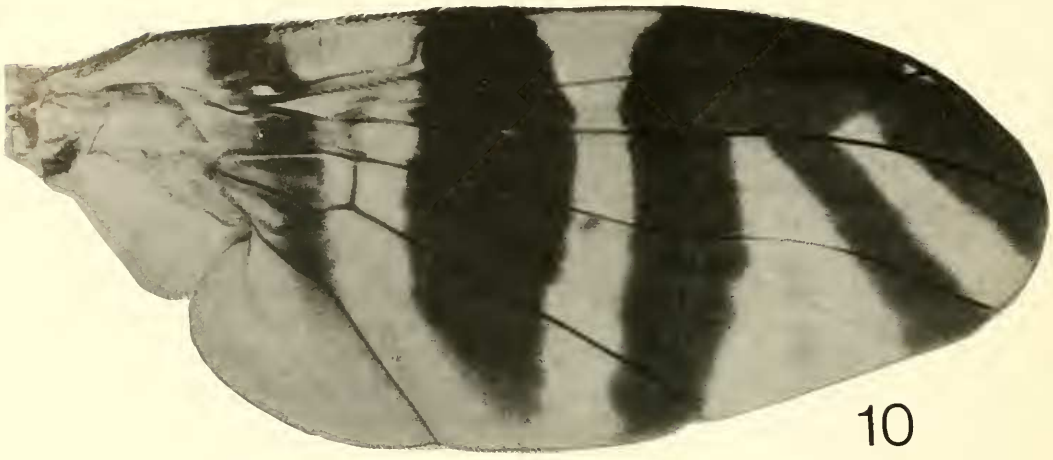


Fig. 10. Wing pattern of *Rhagoletis turpiniae*.

sub-basal and separated at posterior wing margin; anterior and posterior apical bands present and broadly joined to subapical band; accessory costal band absent. Hyaline fascia between apical bands usually as wide as these bands and usually (85% of specimens) extended anteriorly slightly beyond vein R4+5. Abdomen: Mainly black, except for whitish yellow transverse bands at posterior margins of tergites II–IV on male and II–V on female; syntergosternite VII of female entirely black and 1.5 times longer than preceding tergite; aculeus (ovipositor) 1.07–1.12 mm long (Figs. 7, 8) and sharply pointed at apex; spermathecae about 0.37–0.42 mm long, very elongated, with relatively few papillae on surface (Fig. 9). Male terminalia with epandrium blackish, outer surstylus very long and slender, apically rounded and with mesal tuft of long setae; prensisetae situated near midlength of outer surstylus (Figs. 3, 4); distiphallus (glans) with inferior apical appendage with a fringe of slender lobes at apical end (Figs. 5, 6).

Distribution: Known only from the state of Veracruz, Mexico.

Etymology: The name *turpiniae* indicates that this species breeds on plants of the genus *Turpinia* (Staphyleaceae).

Remarks and Phylogenetic Relationships

Rhagoletis turpiniae appears to belong in the *cingulata* species group which also includes *R. cingulata* (Loew), *R. indifferens* Curran, *R. osmanthi* Bush and *R. chionanthi* Bush. All of these species have the following characteristics: 1) wing pattern with sub-basal, discal and subapical transverse bands present, but accessory costal band absent; 2) outer surstylus very elongated with apical tuft of long setae; 3) distiphallus with distal fluted appendage with numerous lobes; 4) spermathecae elongated; 5) third antennal segment pointed at apex; 6) postocellar setae yellow. At least the second and third characters are autapomorphic for the *cingulata* group.

Rhagoletis indifferens is the only species whose populations are allopatric (western USA) from the other three species, which have sympatric populations (eastern and southeastern USA). Their minimal morphological differences make it hard to differentiate them. However, *R. turpiniae* can be separated from all 4 other species of the *cingulata* group by the following characters: 1) in *R. chionanthi, R. osmanthi* and *R. cingulata* all femora are predominantly or en-

tirely yellow, and in *R. indifferens* all the femora are blackish; but in *R. turpiniae* the fore femur is yellow, and the mid and hind femora blackish; 2) the hyaline mark at the end of R2+3, which is always present and often large in the other species, is reduced or absent in *R. turpiniae*; and 3) the hyaline fascia between the anterior and posterior apical bands is not extended anteriorly beyond vein R4+5 in the other species as it usually is in *R. turpiniae*.

Host Plant Relationships

Most American *Rhagoletis* species are associated with plants in the families Rosaceae, Juglandaceae, and Solanaceae; less frequently with Cornaceae, Ericaceae, Cupressaceae, Saxifragaceae, or Berberidaceae (Berlocher and Bush 1982). Two species of the *cingulata* group (*R. cingulata* and *R. indifferens*) breed in species of *Prunus* (Rosaceae) whereas another two species (*R. chionanthi* and *R. osmanthi*) have been reared from species of *Chionanthus* and *Osmanthus* (Oleaceae). *Rhagoletis turpiniae* was found in fruits of two species of *Turpinia* (Staphyleaceae), a genus which occurs in tropical regions of America. Previously, a species of this genus was recorded in Panama as a host for species of the tropical genus *Anastrepha* (*T. occidentalis* (= *paniculata* Vent.) for *A. canalis* Stone, *A. fraterculus* (Wiedemann) and *A. turpiniae* Stone (Stone 1942, Norrbom and Kim 1988b)), but this is the first time a species of this family is recorded as a host plant for *Rhagoletis*. Larvae of *R. turpiniae* were reared from fruits of *Turpinia insignis* (H. B. & K.) Tul, commonly known as "huevo de gato," which is distributed from southern Mexico to Central America and the Antilles. A second sample was obtained from *Turpinia occidentalis breviflora* Croat, which is distributed from southern Mexico to Colombia and the Antilles. The first is an element of tropical deciduous forests (800–2000 m alt) and the latter is present in tropical rain forests (from sea level to 500 m alt) according to Sosa (1988).

Rhagoletis species are mainly distributed in temperate regions where they exhibit winter diapause; however, weather conditions at Los Tuxtlas are not extreme. *R. turpiniae* is a univoltine species presenting a long pupal period, due to *Turpinia* fruiting during about two months of the year. This reenforces that biological cycle adaptations in *Rhagoletis* species are strongly influenced by the fruiting phenology of the host.

Parasitoids

In continental America, some natural enemies have been reported for *Rhagoletis*, such as *Opius, Diachasma,* and *Biosteres* species (Braconidae, Hymenoptera). In the *cingulata* group, *Diachasma ferrugineum* (Gahan), *Opius frecuens* Fischer and *Biosteres melleus* (Gahan) parasitize *R. cingulata*; *Diachasma muliebre* (Muesebeck) and *Opius rosicola* Muesebeck attack *R. indifferens* (Wharton and Marsh 1978); whereas the other species of the group have no parasitoid records. In this study some parasitoids were recovered from pupae of *R. turpiniae*. The most common was an undescribed species of *Biosteres* near *sublaevis* Wharton (in the *mexicana* species group) reared from larvae in fruits of *Turpinia insignis* (Xalapa, Veracruz). One female of *Opius hirtus* Fischer was reared from larvae in fruits of *Turpinia occidentalis breviflora* (Los Tuxtlas); this represents the first record for this species attacking a *Rhagoletis* species, although previously it has been recorded from species of *Anastrepha*. Two specimens of a *Diceratapis* species and *Ganaspis carvalhoi* (Dettmer) of Cynipidae (Hymenoptera) were also recovered.

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